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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/596,892	06/19/2000	Thomas King Tong Chow	9905.1P7	5065

7590

04/01/2002

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EXAMINER

VANOY, TIMOTHY C

ART UNIT

PAPER NUMBER

1754

DATE MAILED: 04/01/2002

12

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	09/596,892		CHOW, THOMAS KING TONG	
	<b>Examiner</b>		<b>Art Unit</b>	
	Timothy C. Vanoy		1754	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- MAILED
- 1) ☒ Responsive to communication(s) filed on 05 February 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,5-7,9-20,23 and 24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-7,9-20,23 and 24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All   b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Information Disclosure Statement*

The IDS dated Jan. 24, 2002 has been received, but the sole reference cited and provided therein, U. S. Pat. 5,294,428, has already been considered and made of record on PTO form 892, provided with paper no. 7.

### *Oath/Declaration*

*ref* The Applicant has not given a post office address anywhere in the application papers as required by 37 C.F.R. 1.33(a), which was in effect at the time of filing of the oath or declaration. A statement over the Applicant's signature providing a complete post office address is required.

*The new declaration submitted with the Amendment mailed on Feb. 5, 2002 has been received, but it also does not set forth if the address provided therein is the inventor's residence address, the inventor's post office address or both.*

### *Drawings*

*would be overcome* a) The specification is again objected to because it does not provide a brief description of Fig. 3A in the Brief Description of the Drawings set forth on pg. 6.

### *Specification*

*modify* a) In line 1 in the abstract, "novel" should be deleted.

Art Unit: 1754

- b) The abstract is objected to because it does not give any examples of the "Selective oxidation catalyst" and the "Claus reaction catalyst".
- c) The abstract is objected because it does not provide a concise and clear description of the Applicants' process in as much as no particular process steps have been described in a particular sequence. It is suggested to revise the abstract to briefly describe the Applicants' process by concisely describing the process steps that the treat the gas.
- d) The abstract is objected to because it makes disparaging remarks about the prior art, i. e. "The prior art fails . . .".
- e) In the abstract, it is not entirely clear if the Applicant's modification to the prior art sulfur recovery processes can be used for *all possible* prior art sulfur recovery processes, or just the *specific* prior art process set forth in U. S. Pat. 5,294,428 mentioned on pg. 7 Ins. 24-26.
- f) The use of the trademark "Selectox" set forth on pg. 7 ln. 28 has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology. The entire specification should be reviewed to ensure that all trademarks are capitalized and/or accompanied with the classic superscripted trademark indicators "TM" or "®".

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Art Unit: 1754

*would be removed*  
g) The status of 09-157,467 set forth on pg. 10 ln. 31 and on pg. 14 ln. 17 in the specification should be updated.

h) The application is objected to because the *handwritten* numbering of pg. 18 has not been initialed and/or dated as is required by 37 CFR 1.52(c).

i) Throughout the specification, the numbers in *all* of the empirical chemical formulas should be subscripted. For example, on pg. 1 ln. 9, the "2" in "H2S" should be subscripted.

*The submission of the substitute specification submitted with the Amendment mailed on Feb. 5, 2002 is noted and has been received, but this substitute specification has not been entered because: (1) the marked-up version of the substitute specification showing all the changes has not been provided, as required by 37 CFR 1.125(b)(2), and (2) the substitute specification did not individually number the paragraphs in Arabic numerals, as required by 37 CFR 1.125(c): please see section 608.01(q) in the MPEP (8<sup>th</sup> ed.) for further details.*

*Therefore, the above objections to the drawings and specification have been maintained since the original, unamended specification containing the above objections is still pending in this application file.*

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 1754

*would overcome*

a) Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Original claim 22 sets forth the limitations of claim 24 in context of "... an oxygen containing gas at less than or equal to 100 mole percent oxygen ...", however claim 24 is dependent on claim 1 which recites "... oxygen containing gas being limited ... to contain less than or equal to about 28 mole percent oxygen ...". Changing the dependency of claim 24 to depend on claim 2 would resolve this issue.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The person "having ordinary skill in the art" has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

Claims 1-3, 5-7, 9-18, 20, 23 and 24 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U. S. Pat. 6,214,311 B1 to Kwong.

The Kwong patent describes what appears to be the same process for treating the effluent from the thermal stage of a Claus-type sulfur recovery process, comprising the steps:

Feeding the hydrogen sulfide-containing gas together with a process air stream into a burner within the thermal stage so that a portion of the hydrogen sulfide is oxidized into elemental sulfur (please see col. 4 Ins. 9-16 and col. 7 Ins. 15-23);

Passing the effluent derived from the thermal stage into one of more selective catalytic oxidation stages (with process air, oxygen-enriched air or oxygen) so that the hydrogen sulfide is selectively oxidized into elemental sulfur (please see "step 4" in col. 4 Ins. 26-30; col. 5 Ins. 6-13 and col. 12 In. 63-66).

Note that col. 12 ln. 64 reports that only a "sufficient" amount of air was used for the hydrogen sulfide oxidation, in a manner that is not seen to be distinct from the "controlled by limiting the amount of oxygen" limitation of Applicants' claim 7.

Note that the gas is heated before injection into the selective catalytic oxidation stages and the gas from the selective catalytic oxidation stages is condensed (please see col. 12 ln. 63 and col. 13 ln. 1), in a manner that is not seen to be distinct from the limitations of Applicant's claim 9.

Note that col. 13 lns. 59-65 reports that gas exiting the selective catalytic oxidation stages may be subjected to a "catalytic combustion" before release into the atmosphere, in a manner that is not seen to be distinct from the "Claus reaction catalyst" limitations of Applicant's claims 13 and 15-18.

Note that col. 13 lns. 1-3 reports that the gas exiting the selective catalytic oxidation stages contains only 0.05 mole percent hydrogen sulfide and 0.08 mole percent sulfur dioxide (after condensation), in a manner that is submitted to meet the limitations of Applicant's claims 1-3 and 14.

The limitations of Applicant's claims 20, 23 and 24 are noted, but it is submitted that the same process (and/or obvious variation thereof) will inherently exhibit the same capacity increase reported in claims 20, 23 and 24.

The differences between the Applicants' claims and the Kwong patent is that the Applicants' claims 1, 2 and 3 further describe the hydrogen sulfide content in the gas to be treated in their "mid-location catalytic stages" (corresponding to the "one or more catalytic stages" set forth in step 4 in col. 4 lns. 26-29 in the Kwong patent) and also



Art Unit: 1754

describes the oxygen content in the oxygen containing gas used in the burner in the thermal stage and Applicants' claims 1-3 and 5-6 describe the content of non-elemental sulfur components present in the tail gas (corresponding to the effluent exiting the "one or more catalytic stages" set forth in step 4 in col. 4 lns. 26-29 in the Kwong patent), however it is submitted that these differences would have been obvious to one of ordinary skill in the art at the time the invention was made because it is submitted to be within the skill level of the person having ordinary skill in the art to readily determine what concentrations, etc. were used in the process of U. S. Pat. 6,214,311 B1 described above. Since no perceptible differences are seen or have been shown, these claims are rejected under 35 USC 102 (as well as 35 USC 103).

Claim 19 has not been rejected under either 35 USC 102 or 35 USC 103 because none of the references of record teach or suggest the claimed mixture of two or more catalysts wherein one of the catalysts is the selective oxidation catalyst.

### ***Response to Arguments***

The Applicants' arguments submitted in their Amendment mailed on Feb. 4, 2002 (paper no. 9) have been fully considered but they are not persuasive.

a) *The Applicants argue that Kwong (US 6,214,311 B1) does not teach any benefit in moving the selective oxidation catalyst upstream of the tail gas unit. No one has suggested the invention process for selective oxidation catalyst at mid-location catalytic stages. Kwong's direction to one skilled in the art is to either a sulfur reduction catalyst*

Art Unit: 1754

*or a Claus reaction catalyst in the mid-locations, rather than the Applicant's selective reduction catalyst.*

The Applicants' claims define the "mid-location catalytic stages" as being between the last thermal stage and the tail gas unit. In comparing the scope of the Applicants' claims with U. S. Pat. 6,214,311 B1, the claimed last thermal stage is submitted to correspond to the last (or sole) thermal stage in the thermal stage set forth in step (1) set forth in col. 4 in U. S. Pat. 6,214,311 B1 and the claimed tail gas unit is submitted to correspond the thermal or catalytic combustion stage mentioned in col. 13 ln. 63 in U. S. Pat. 6,214,311 B1 (located between the last catalytic selective oxidation stage (126) and the discharge stack: please see col. 13 lns. 59-65 in U. S. Pat. 6,214,311 B1) so that the claimed "mid-location catalytic stages" are submitted to embrace all of the catalytic stages mentioned in steps (2), (3) and (4) in col. 4 in U. S. Pat. 6,214,311 B1, which are located between the last thermal stage of step (1) in col. 4 and the thermal or combustion stage of col. 13 ln. 63 (i. e. a "tail gas unit") of U. S. Pat. 6,214,311 B1.

Applicants' claims 1 and 2 only requires that the at least some of the Claus reaction catalyst in one or more of the mid-location stages be replaced with selective oxidation catalyst, but this is not patentably distinct from the selective oxidation catalyst set forth in step (4) in col. 4 in U. S. Pat. 6,214,311 B1 (and/or, alternatively, the "selective oxidation stage 126" mention in col. 13 ln. 60) since "at least some" embraces complete replacement of the Claus catalyst with selective oxidation catalyst. The mid-location selective oxidation catalyst of Applicant's claim 3 is not distinct from the mid-

Art Unit: 1754

location selective oxidation catalyst set forth in step (4) in col. 4 in U. S. Pat. 6,214,311  
– hence the rejection is maintained.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy C. Vanoy whose telephone number is 703-308-2540. The examiner can normally be reached on 8 hr. days.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffen can be reached on 703-308-1164. The fax phone numbers

Art Unit: 1754

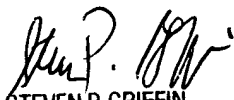
for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Timothy Vanoy/tv  
March 27, 2002

*jev*  
Timothy Vanoy  
Patent Examiner

Art Unit 1754

  
STEVEN P. GRIFFIN  
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